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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

VERINATA HEALTH, INC., Plaintiff and Counterclaim-Defendant, vs. ARIOSA DIAGNOSTICS, INC., Defendant and Counterclaim-Plaintiff.	Lead Case No. 3:12-cv-05501-SI Case No. 3:14-cv-01921-SI Case No. 3:15-cv-02216-SI **ARIOSA DIAGNOSTICS, INC.'S, NOTICE OF MOTION AND RENEWED MOTION FOR JUDGMENT AS A MATTER OF LAW UNDER RULE 50(b) AND MOTION FOR NEW TRIAL UNDER RULE 59 ON ISSUES FOR WHICH PLAINTIFFS BORE BURDEN OF PROOF; MEMORANDUM IN SUPPORT** Judge: Hon. Susan Illston Hearing Date: April 6, 2018 Hearing Time: 9:00 am Ctrm: 1, 17th Floor
ILLUMINA, INC., Plaintiff and Counterclaim-Defendant vs. ARIOSA DIAGNOSTICS, INC., Defendant and Counterclaim-Plaintiff.	

ILLUMINA, INC.,

Plaintiff and Counterclaim-Defendant

vs.

ARIOSA DIAGNOSTICS, INC.,

Defendant and Counterclaim-Plaintiff.

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NOTICE OF MOTION AND MOTION

PLEASE TAKE NOTICE that on April 6, 2018, at 9:00 am or as soon thereafter as the matter may be heard by the Honorable Judge Susan Illston in Courtroom 1, 17th floor of the United States District Court for the Northern District of California, 450 Golden Gate Ave, San Francisco, CA 94102, Defendant and Counterclaim Plaintiff Ariosa Diagnostics, Inc. ("Ariosa") hereby moves for renewed judgment as a matter of law ("JMOL") pursuant to Fed. R. Civ. P. 50(b) on issues for which Plaintiffs bore the burden of proof (infringement and patent damages) and for a new trial pursuant to Fed. R. Civ. P. 59. The jury verdict that Harmony Version 2 ("V2") infringes the '794 patent and that Harmony Version 1 ("V1") infringes the '794 and '430 patents, and the jury's damages verdict, are not supported by substantial evidence, and alternatively, are against the great weight of the evidence. Plaintiffs' presentation of misleading argument and multiple violations of Court orders also warrant a new trial on infringement and patent damages.

This Motion is based on this notice of motion and supporting memorandum of points and authorities, the testimony and evidence admitted at trial, all pleadings, exhibits, and records in this action, and such other evidence and argument as may be submitted to the Court in connection with this Motion or that the Court may take notice or otherwise consider.

MEMORANDUM OF POINTS AND AUTHORITIES

Plaintiffs prevailed on infringement based on a confusing and misleading trial presentation as well as speculative and conclusory expert testimony. The jury verdict and damages award are not based on substantial evidence, and, at minimum, are against the great weight of the evidence.

I. JMOL OF NON-INFRINGEMENT, OR A NEW TRIAL, FOR HARMONY V2

The jury verdict that Harmony V2 infringes the '794 patent is not supported by substantial evidence. No reasonable jury could have found that Harmony V2 practices steps 1(a), (b), (f) and (g) of the '794 patent. Alternatively, Ariosa is entitled to a new trial on Harmony V2 infringement.

A. Harmony V2 Does Not Practice Steps 1(a) And (b) Of The '794 Patent

1. Ariosa Does Not Perform The "Providing" And "Contacting" Steps

To establish infringement of the '794 patent, Plaintiffs had the burden to prove Ariosa performs each step of Claim 1. *NTP, Inc. v. Research in Motion, Ltd.*, 418 F. 3d 1282, 1318 (Fed.

Cir. 2005) ("[T]he use of a process necessarily involves doing or performing each of the steps recited."). Steps 1(a) and (b) recite a "providing" step followed by a "contacting" step: (a) *first* "*providing* a sample which may contain at least 100 different single-stranded target sequences attached to a first solid support," and *then* (b) "*contacting* said target sequences with a probe set … such that different double-stranded hybridization complexes are formed." Ex. 513 ('794 Patent) [1]. The Court ruled step 1(a) must be performed before step (b). Ex. A (Trial Tr.) 1855:7-13. The undisputed evidence established that in V2, Ariosa does not perform the "providing" and "contacting" steps of the '794 patent at all, much less as claimed in the recited order.

Instead of *providing* single-stranded target sequences *attached* to a first solid support and then *contacting* said target sequences with a probe set, as Claim 1 requires, Ariosa starts the assay by providing target sequences *unattached* to a solid support, and then contacts those *unattached* target sequences with a probe set during a two-hour hybridization ("annealed DNA") step. Ex. 66 (Harmony V2 Standard Operating Procedure ("SOP")) at 14 (§ 13.4). Only then—*after* contacting the unattached target sequences with a probe set—does Ariosa add the solid support (streptavidin beads). *Id.* at 14 (§ 13.5). This was undisputed at trial. Plaintiffs' expert, Dr. Cooper, admitted that "[i]n Version 2 of Harmony, the attachment step where the beads are added comes after the step where the probes are added." Trial Tr. 1005:3-6; *id.*, 964:6-8 ("they first add the probes … they allow that two hours to go, and then they introduce the streptavidin beads."). Ariosa does nothing to "contact[]" single-stranded target sequences already attached to a solid support "with a probe set." *Id*. As a result, Ariosa does not "perform[] each of the steps recited" in Harmony V2 and thus does not infringe the '794 patent. *NTP, Inc.*, 418 F. 3d at 1318.

2. There Is No Evidence That 100 Different Target Sequences Attach To A Bead, And Only *Thereafter* Hybridize To All Three Probes

Plaintiffs could not, as the law requires, base their infringement case on evidence that Ariosa performs the recited steps, since Ariosa does not do so. Instead, Plaintiffs built an infringement case around confusion, speculation, and the guesswork of their expert, Dr. Cooper.

[1] "Ex." refers to exhibits to the Declaration of Sandra L. Haberny, filed concurrently with and in support of Ariosa's Motions.

(a) Undisputed Facts Concerning Harmony V2

For each target sequence that Harmony seeks to analyze, the assay uses three distinct probes—a left, middle, and right probe—each with sequences complementary to adjacent parts of the target. Trial Tr. 953:4-5, 20-22 (Dr. Cooper). Harmony requires that all three probes hybridize to the target to carry out the next step, in which the three probes are all ligated (enzymatically joined) together. *Id.*, 1699:9-10 (Dr. Cooper) ("If they're not all three hybridized and in proximity, then the ligation can't be successful"). If even one of the three probes fails to hybridize, there is no ligation. *Id.* Importantly, the left and right probes include priming sites necessary for the next step after ligation, which is to amplify (copy) the ligation product. And if there is no product of ligation that can be copied, nothing can be detected in the later steps of the assay. As a result, all three probes must hybridize to the target for it ultimately to be detected. *Id.*, 1011:13-18 (Dr. Cooper) (to be detected, the targets would have to "hybridize to all three probes").

As noted above, in Harmony V2 there is an isolated two-hour hybridization step prior to the addition of any beads (solid support). Ex. 66 at 14 (§ 13.4); Trial Tr. 1004:15-18 (Dr. Cooper). During this hybridization step, the probes are added in significant molar excess as compared to the (unattached) target sequences: for every target sequence molecule, there are at least 10 million complementary probes. Trial Tr. 1070:1-2 (Dr. Oliphant) ("There are 10 million oligonucleotides for every target molecule in the DANSR test."). Only after the two-hour hybridization step, the beads are added. After that, the solution is washed to remove molecules that did not attach to beads. Ex. 66 at 14 (§ 13.5); Trial Tr. 972:13-16 (Dr. Cooper).

(b) Dr. Cooper's Speculative Theory

Testifying about the hybridization step as described in the Harmony V2 SOP (Ex. 66), Dr. Cooper admitted that the "***the goal of this*** is to put in and ***allow hybridization to occur before the solid support***." Trial Tr. 1003:14-19. Because the claim requires contacting with a probe set target sequences that are already attached to a solid support (the bead), it is undisputed that Harmony V2 was designed to perform the assay in a non-infringing manner. *See id.*, 1001:17-18 (Dr. Cooper) ("the probes are added; and the cartoon is illustrating that the goal is to achieve hybridization"). Despite these admissions, Dr. Cooper concocted an infringement theory based on speculation

about an admittedly unintended reaction as to what might have gone wrong during the hybridization step and which involved, at most, a miniscule fraction of target sequences.

Specifically, Dr. Cooper speculated that "at least 100" single-stranded target sequences (1) fail to hybridize with even one probe during the two-hour hybridization step, despite the ten million-to-one ratio of probes to targets, and then attach to a bead as single-stranded sequences, and (2) only then, *for reasons he never explained*, after failing to hybridize for two hours, the targets hybridize to all three probes in the minutes before the solution is washed, and then carry on to completion in the assay. Both conditions are required for infringement under Dr. Cooper's theory; otherwise the probes complementary to the target sequences would not be ligated, amplified, and ultimately detected, as required to complete the claimed method.

(c) There Is No Evidence To Support Dr. Cooper's Theory

Nearly all of Dr. Cooper's testimony on steps 1(a) and (b) for Harmony V2 focused on the first condition—that at least 100 different target sequences fail to hybridize to a single probe during the hybridization step, and then attach to beads as single-stranded sequences. This was a sideshow. Even if Plaintiffs had actually proved that this happens (they did not), ***this would still not suffice to prove infringement.*** Plaintiffs also had to prove the second condition: that those target sequences—which did not hybridize with a single probe during the two-hour hybridization step—somehow hybridize with all three probes *after* attaching to a bead, and then proceed through all of the numerous subsequent steps to finally be detected. This was a critical missing link in Plaintiffs' theory: unless all three probes hybridize to the target sequence after it attaches to a bead while single-stranded, the target would not be detected and hence there could be no infringement.

Dr. Cooper presented no evidence to support his theory that at least 100 different target sequences *first* attach to a bead *and then hybridize to all three probes*—despite having failed to hybridize to a single probe during the two-hour hybridization step. Tellingly, Dr. Cooper conducted no experiments and offered no empirical data to support his conjecture. Instead, Dr. Cooper showed the jury an animated video that Plaintiffs' litigation team created to dramatize his theory, without any evidence that it actually occurs. Trial Tr. 1014:19-23. Dr. Cooper simply stated, without support: "And then they allow continued time to proceed. And that would, in fact,

allow those now—those single-stranded fragments that are now attached to a solid support to contact and hybridize with their oligos." *Id*., 965:1-4. He offered no explanation as to why these target sequences would fail to hybridize with any probe during the two hours before the beads are added, but then suddenly hybridize to all three probes in the minutes thereafter before the wash. He did not identify (nor could he) how many of these target sequences would hybridize with all three probes after attaching to a bead. And he did not testify (nor could he) that such post-attachment hybridization happens with every sample that Ariosa runs in Harmony V2.

When pressed at trial about his reliance on his made-up animation instead of actual lab experiments to determine what actually occurs in Harmony V2, Dr. Cooper complained that "[he] would have no capacity to get Ariosa's internal lab samples or products." *Id*., 1014:17-18. This excuse is unavailing. Plaintiffs' litigation decision not to request or test Harmony V2 lab samples does not dispose of their obligation to produce actual evidence of infringement. *See Kim v. ConAgra Foods, Inc.*, 465 F.3d 1312, 1320 (Fed. Cir. 2006) (affirming JMOL of no infringement where expert "offered conclusory testimony that the additional ingredients would not have materially affected the pertinent characteristics of the bread [but] did not support this determination with any examinations or tests *of the actual accused products*.") (emphasis added). Nor did Plaintiffs offer testimony from a single fact witness supporting Dr. Cooper's speculation.

This Court denied summary judgment to Ariosa regarding non-infringement by Harmony V2 based on Plaintiffs' representation that Dr. Cooper would "base[] this conclusion on, inter alia, the amount of cfDNA used in Harmony V2, the temperature applied, the mass of a DNA nucleotide, the number of target sequences and their approximate length, and other witness testimony." D.I. 517 at 29:13-21. At trial, Dr. Cooper wholly failed to do so. Dr. Cooper offered no explanation—based on temperature, mass, number and length of sequences, or any other conditions—for his conclusion that at least 100 target sequences will suddenly hybridize to all three probes in the minutes after the beads are added. Instead, Dr. Cooper merely offered the conclusory testimony quoted above, which does not amount to substantial evidence as a matter of law. *See, e.g., Whitserve, LLC v. Comput. Packages, Inc.*, 694 F.3d 10, 24 (Fed. Cir. 2012) ("general and conclusory testimony is not enough to be even substantial evidence in support of a

verdict"); *Koito Mfg. Co. v. Turn-Key-Tech, LLC*, 381 F.3d 1142, 1152 (Fed. Cir. 2004) (same); *Arthur A. Collins, Inc. v. N. Telecom Ltd.*, 216 F.3d 1042, 1046 (Fed. Cir. 2000) ("[I]t is well settled that an expert's unsupported conclusion on the ultimate issue of infringement is insufficient to raise a genuine issue of material fact…."); *cf. Pixion, Inc. v. Citrix Sys., Inc.*, 887 F. Supp. 2d 881, 889-90 (N.D. Cal. 2012) (Illston, J.) (granting summary judgment of no infringement where patentee "simply [] offer[ed] an opinion of an expert that states, in effect, that the critical claim limitation is found in the accused device").

Finally, Dr. Cooper's testimony that at least 100 different target sequences will not hybridize at all during the hybridization step was internally inconsistent with his conclusory testimony that those same sequences will hybridize with all three probes after the beads are added. To explain the first part of his theory, Dr. Cooper emphasized the difficulty of achieving hybridization in V2 due to "the complexity of this reaction." *Id.*, 1674:11-12 ("But what we have to keep in mind is the complexity of this reaction."); *id.*, 1673:3-8 ("so really it's a highly complex mixture"); *id.*, 1674:14-1675:3 (same). In Dr. Cooper's telling, multiple conditions in Harmony V2 conspire against hybridization: "loads of incorrect interactions," "random collisions," and an "overwhelm[ing] concentration of the wrong probes." *Id.*, 968:16-19, 966:14-967:6, 1012:25-1013:5. These alleged conditions led Dr. Cooper to the conclusion that the "reaction would be relatively slow, because it takes a while in that soup of—that sort of messy soup—to get the correct probe target pairing." *Id.*, 1675:7-10. This explanation stands in stark contrast to the second part of Dr. Cooper's theory: that after allegedly failing to hybridize with even one probe during the *two-hour* hybridization step, these at least 100 target sequences would suddenly hybridize with all three of their respective probes in the *minutes* following addition of the beads.

The second part of Dr. Cooper's theory is irreconcilable with the first. If the hybridization reaction is so complex and slow that at least 100 target sequences fail to hybridize with any probes during the *two-hour* hybridization phase, as Dr. Cooper posits, why would these same target sequences suddenly hybridize with all three probes in the *minutes* after attaching to a bead? Dr. Cooper offered no explanation or theory whatsoever, and never even addressed this question. His testimony on these issues was fundamentally inconsistent. In short, it is unproven that any

target sequence that failed *to hybridize with a single probe* during the two-hour hybridization step would then, after attaching to a bead, suddenly hybridize with all three cognate probes and proceed through the rest of the assay.

Dr. Cooper's speculative and inconsistent testimony—for which he cited no evidentiary support—cannot justify a finding of infringement. *See, e.g., Lucent Techs., Inc. v. Gateway, Inc.*, 543 F.3d 710, 722-24 (Fed. Cir. 2008) (affirming finding of no infringement as a matter of law where patentee's infringement evidence "established only uncertainty and speculation," expert "did not know at what rates" infringement occurred and "did not ever observe" infringement). Because there is no substantial evidence that Ariosa performs steps 1(a) and (b) of the '794 patent in Harmony V2, the Court should grant JMOL of non-infringement. *See Cordis Corp. v. Bos. Sci. Corp.*, 658 F.3d 1347, 1358 (Fed. Cir. 2011) ("find[ing] very little evidence to support the jury's verdict" of infringement and thus affirming JMOL of non-infringement).

3. Ariosa Is Entitled To A New Trial On Harmony V2 Infringement

Alternatively, the jury verdict that Harmony V2 infringes the '794 patent is against the great weight of the evidence for all of the foregoing reasons. In addition, a new trial is particularly warranted given that Plaintiffs based their infringement case on testimony from Dr. Cooper that lacked any indicia of reliability. *See Daubert v. Merrel Dow Pharms., Inc.*, 509 U.S. 579, 593-94 (1993). Dr. Cooper admitted his speculative theory about Harmony V2 infringement (1) has not been tested (Trial Tr. 1014:16-19); (2) does not find support in journals subject to peer review or publication (*id.*, 1010:10; Ex. B (Cooper Depo. Tr. 221:6-13)); (3) lacks any indication of what the potential error rate would be (Trial Tr. 1007:17-19, 1008:22; Ex. C (Cooper Depo. Tr. 227:11-24)); and (4) has not been generally used or accepted by the scientific community (Trial Tr. 1009:13-21). As a result, at minimum, Ariosa is entitled to a new trial on Harmony V2 infringement. *Chiron Corp. v. Genentech, Inc.*, 363 F.3d 1247, 1258 (Fed. Cir. 2004) ("A trial court should grant a motion for a new trial if ... the verdict is contrary to the great weight of the evidence.") (citing *Murphy v. Long Beach*, 914 F.2d 183, 186 (9th Cir. 1990)).

Ariosa is also entitled to a new trial because Plaintiffs introduced evidence on the doctrine of equivalents ("DOE") for steps 1(a) and (b) *in violation of the Court's prior rulings.* The Court

repeatedly ruled that Plaintiffs could not present a DOE theory for steps 1(a) and (b). *See* D.I. 329; D.I. 417 at 37:2-6; Ex. D (Pretrial Conf. (Dec. 20, 2017) Tr.) 106:2-107:2. The Court also ruled that Plaintiffs could not present expert testimony from the IPRs to argue DOE, and further ruled that if Plaintiffs believe IPR testimony "is relevant to another issue, they shall request specific relief ***prior to*** presenting such testimony." D.I. 547 at 6:12-13 (emphasis added).

Plaintiffs violated these rulings by improperly arguing equivalency for those steps—and doing so by presenting IPR testimony without first seeking relief from the Court. *See, e.g.*, Trial Tr. 1422:19-1423:4; *id.*, 1429:5-19 (reading Dr. Ward depo.) ("'[Q.] Could you explain what was the basis of your testimony that it didn't matter whether you did Step A first or Step B first of Claim 1 of the '794 patent?' … [A.] 'There's not a significant difference in both approaches.'").

Plaintiffs then compounded these violations by using the improperly-introduced IPR testimony to represent as fact a known falsehood—namely, that Ariosa hired many experts who disagreed with its non-infringement position prior to finding "Dr. Quackenbush [who] was the one that would give [Ariosa] this testimony." Trial Tr. 1896:21-1897:12 (Plaintiffs' closing); *id.*, 1903:13-19 (Plaintiffs' closing) (misleading argument that Prof. Quackenbush's non-infringement opinion was inconsistent with IPR testimony from Dr. Ward—whom counsel referred to as "one of their experts that's off"—that had nothing to do with either version of Harmony; "We know they had Dr. Ward as an expert. We know they paid Dr. Fu as an expert. Those two didn't show up.") *id.*, 960:13-15 (Dr. Cooper testifying that he "reviewed deposition testimony from a Dr. Fu, who—and I understand will not testify in this case, but was an expert witness for Ariosa"); *id.*, 1901:25-1902:2 (Plaintiffs' closing) ("By the way, you didn't hear any other experts that we shopped around…"); *id.*, 1971:11-19 (Plaintiffs' closing) ("… Dr Ward, who you didn't see here, because he's a former expert …"; "They – that wasn't the only one. Dr. Fu, another expert that they shooed away…"). Plaintiffs were well aware that the IPR proceeding did not involve questions of infringement and that Ariosa's IPR experts never even received any information about the way in which either version of the Harmony test worked or works. *See, e.g.*, Trial Tr. 957:5-14. The Court's rulings should not be permitted to be so flagrantly violated. A new trial is the only way to remove the taint of Plaintiffs' improper arguments and evidence.

A court may also grant a new trial upon "substantial errors in … instructions to the jury." *Montgomery Ward & Co. v. Duncan*, 311 U.S. 243, 251 (1940). Here, the jury instructions included an improper DOE instruction indicating that DOE was available to all elements of the '794 patent claims. *See* D.I. 622 at 7:3 (Ariosa's objection). But the Court expressly ruled on three separate occasions that DOE was not available to Plaintiffs on the order of steps 1(a) and (b). *See, e.g.*, D.I. 517 at 37. Given the impact of that error when coupled with Plaintiffs' counsel's repeated violation of this Court's orders, a new trial should be granted.

B. No Reasonable Jury Could Conclude That Harmony V2 Practices Steps 1(f) Or (g) Of The '794 Patent

In addition to Plaintiffs' failure to prove that Harmony V2 practiced steps 1(a) and (b) of the '794 patent, Plaintiffs also failed to present substantial evidence that Harmony V2 practices steps 1(f) and (g) either literally or under DOE. These steps recite, respectively, "immobilizing said different amplicons to a second solid support" and "detecting said different amplicons immobilized to said second solid support, thereby determining whether the sample contains at least 100 different target sequences." Ex. 513. Critically, both of these steps are required to be performed with "*amplicons*."

The claimed "amplicons" are produced in step 1(e), which recites: "contacting said modified probes with: (i) at least a first primer that hybridizes to said universal priming site; (ii) NTPs; and (iii) an extension enzyme; *wherein said different modified probes are amplified and forming different amplicons*." *Id.* (emphasis added). The Court construed the "modified probe" being amplified as "an enzymatically altered polynucleotide which contains a universal priming site and is capable of substantially hybridizing to a target sequence." D.I. 199 at 9. The Court further construed "wherein said different modified probes are amplified and forming different amplicons" as: "wherein the different modified probes are replicated, in whole or in part, to yield amplification products of each of the different modified probes." *Id.* at 11. As a result, under the Court's construction, whatever is replicated—whether in whole or part—is the recited "amplicon."

1. Harmony V2 Does Not Literally Practice Steps 1(f) And (g)

The evidence uniformly confirms that in Harmony V2, there is no immobilization or

detection of "amplicons" as required by steps 1(f) and (g). First, the undisputed evidence is that in Harmony V2, each modified probe—"which contains a universal priming site and is capable of substantially hybridizing to a target sequence," *see* D.I. 199 at 9—is replicated ***in whole***. *See, e.g.*, Trial Tr. 1072:14-1073:12 (Dr. Oliphant testimony that modified probes are replicated in whole in V2); *id.*, 1398:15-1400:5 (same testimony from Prof. Quackenbush). Dr. Cooper admitted that "Ariosa doesn't replicate only a part of the modified probe; Ariosa replicates the entire modified probe," and that what is amplified includes "two universal priming sites" and "sequence that's complementary to the target." *Id.*, 1623:19-1624:12; *id.*, 1027:16-1029:20 (same). Under the Court's construction, then, the claimed "amplicons" in Harmony V2 are copies of the entire modified probe, which is replicated *in whole*, including its universal priming sites and complementary target sequence.

It is also undisputed that, contrary to the requirements of steps 1(f) and (g), Harmony V2 does not "immobilize . . . amplicons" as construed by the Court. *See* D.I. 199 at 11. As Dr. Cooper admitted, in Harmony V2 "the amplicon is cut up … [a]nd most of it is thrown away." Trial Tr. 1030:2-24. Instead of immobilizing amplicons, Harmony V2 only immobilizes readout cassettes. *Id.*, 1624:23-1625:2 (Dr. Cooper) ("Q. Sir, the Readout Cassette is the only thing that's attached to the microarray. Correct? A. Yes."). Unlike amplicons, a readout cassette "lacks the universal priming site, and lacks the sequence that's complementary to the target sequence." *Id.*, 1030:17-24 (Dr. Cooper). Readout cassettes are created through the enzymatic *destruction* of amplicons *after* replication. Dr. Oliphant explained that a "restriction enzyme" "chop[s] up" what is produced by amplification, and only a "cassette" that "does not have a left universal PCR priming site or a right universal PCR priming site" is "appl[ied] to the array." *Id.*, 1074:17-1075:25; *id.*, 1374:18-1375:2, 1400:6-23 (same testimony from Prof. Quackenbush). Readout cassettes and amplicons are indisputably different. For example, Dr. Cooper himself admitted that "literal amplicons can be copied" in Harmony V2, whereas readout cassettes lack the priming sites required for copying. *Id.*, 1033:2-5, 1031:5-9; *id.* 1075:17-21.

In sum, amplicons—*i.e.*, copies of the modified probes, which are replicated *in whole* in Harmony V2—are never immobilized to a solid support. Instead, as Dr. Cooper again admitted,

"the Readout Cassette is the only thing that's attached to the [second solid support]," but "the rest of the amplicon is destroyed." *Id.*, 1624:23-1625:2. As a result, there is no literal infringement under the Court's claim constructions as a matter of law.

Plaintiffs' literal infringement case was based on an interpretation of "amplicon" that was contrary to the Court's claim constructions. Dr. Cooper testified that, under his theory, an "amplicon" is something that can be created *after* completion of the claimed amplification step and *following* the enzymatic destruction of what was actually replicated during amplification. *Id*., 1030:4-15; *id*., 1624:23-1625:2. In contrast, the Court's construction makes clear that whatever is replicated—in whole or in part—is the amplicon. Plaintiffs' attempt to replace this Court's well-reasoned construction with Dr. Cooper's contrary interpretation fails and underscores why JMOL is required here. *Tex. Instruments, Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1564-65 (Fed. Cir. 1996) (expert testimony inconsistent with proper claim construction was *not* substantial evidence to support jury verdict of literal infringement).

Finally, Ariosa is entitled to JMOL of non-infringement for Harmony V2 for the separate and independent reason that it does not practice step 1(g), which requires "detecting said different amplicons *immobilized to said second solid support*." Ariosa respectfully requests that the Court revisit its claim construction ruling on this issue in its summary judgment order. D.I. 517 at 41-42. The plain language of the claim requires that detection occur while the amplicons are immobilized. The claim language was amended to add the highlighted language to the original language simply requiring "detecting said amplicons." The added language must not be read out of the claim. *Generation II Orthotics Inc. v. Med. Tech. Inc.*, 263 F.3d 1356, 1365 (Fed. Cir. 2001) (construction may "not revise or ignore the explicit language of the claims"). It is undisputed that in Harmony V2, detection occurs only after the readout cassettes—even assuming, contrary to the facts, that they are amplicons—are removed from the array (second solid support). For example, Dr. Cooper admitted that after the fluorescent probes are ligated to the array, the readout cassettes are "no longer need[ed]" and are "wash[ed] away." Trial Tr. 982:9-13. Only then, after the readout cassettes are removed from the array, is a "picture of this image" taken, which Dr. Cooper identifies as satisfying the claimed "detecting" step. *Id.* Thus, the readout cassettes are not

immobilized to the array during the detecting step, and step 1(g) is not performed.

2. Harmony V2 Does Not Practice Steps 1(f) And (g) Under DOE

Plaintiffs also failed to prove infringement of steps 1(f) and (g) under DOE. The evidence at trial demonstrated that there are substantial differences between immobilizing readout cassettes as done in Harmony V2 versus immobilizing amplicons as claimed in the '794 patent. The function, way and result between the two could not be more different, as evidenced by the undisputed testimony of Dr. Oliphant: Ariosa tried using both, and determined that immobilizing amplicons **did not** work for Harmony V2, but immobilizing readout cassettes does. Asked if Ariosa would "get data or any useful information at all" if Harmony V2 "immobilized the amplicons rather than the cassettes," Dr. Oliphant testified, "No, it's not useful. We tried it. It doesn't work." *Id.*, 1078:7-12; *id.*, 1076:22-1077:1 ("Q. Now, why go through all of this trouble? Why not just apply the amplicon on the array? A. Well, you're right, it is trouble. And, in fact, it would be easier if we could do that. ***But we tried it and it really doesn't work***."). Dr. Oliphant detailed the significant differences between readout cassettes and amplicons in terms of their size, kinetics and steric hindrance, and how those differences resulted in readout cassettes that worked in Harmony V2 and amplicons that did not. *Id.*, 1076:22-1077:21; Ex. 1655.

Plaintiffs' expert, Dr. Cooper, did not dispute Dr. Oliphant's testimony that immobilizing amplicons instead of readout cassettes did not work in Harmony V2. Trial Tr. 1625:3-19; *id.*, 1677:1-9. In light of these undisputed facts, no reasonable jury could find that a non-functional "amplicon" is substantially the same as a functional readout cassette. They produce opposite results—the latter works in Harmony V2, the former does not.

Faced with these undisputed facts, Plaintiffs built a DOE theory around conclusory and irrelevant testimony from Dr. Cooper. First, Dr. Cooper merely rehashed his literal infringement opinion under the guise of DOE. For example, asked whether there is "any similarity … between a full amplicon and a cleaved amplicon that further supports" his opinion that they perform substantially the same function, Dr. Cooper testified: "Yes, they're both amplicons, and they're both DNA molecules that hybridize with similar kinds of properties." *Id.*, 1682:7-16. But this merely assumes literal infringement—that readout cassettes and amplicons "are both amplicons."

Bootstrapping DOE to an opinion on literal infringement fails as a matter of law. "The evidence and argument on the doctrine of equivalents cannot merely be subsumed in plaintiff's case of literal infringement." *nCube Corp. v. Seachange Int'l, Inc.*, 436 F.3d 1317, 1325 (Fed. Cir. 2006) (quoting *Lear Siegler, Inc. v. Sealy Mattress Co.*, 873 F.2d 1422, 1425 (Fed. Cir. 1989)).

Second, Plaintiffs solely relied on Dr. Cooper's conclusory testimony as to the alleged similarity between amplicons and readout cassettes without providing the required "particularized testimony and linking argument as to the 'insubstantiality of the differences.'" *Tex. Instruments*, 90 F.3d at 1567. For example, Dr. Cooper testified that amplicons and readout cassettes hybridize with "similar kinds of properties," but he failed to identify those properties, much less demonstrate the absence of any substantial differences with respect to those properties. Trial Tr. 1682:12-16.

To the contrary, Dr. Cooper's only testimony specifically addressing "properties" of hybridizing shows that there *are* differences, and important differences at that. It is undisputed that amplicons are substantially longer than readout cassettes in Harmony V2. *Id.*, 1075:8-10 (Dr. Oliphant) ("but the part that concerns us now is a part we'll call the 'cassette.' This is a small fraction of the amplicon"); *id.*, 1624:23-1625:19 (Dr. Cooper) (acknowledging "rest of the amplicon is destroyed" and no "reason to dispute [Dr. Oliphant's] testimony"). Dr. Cooper admitted that "size" of an oligonucleotide would "be one important factor among a variety of factors that ultimately dictate how" immobilization works in Harmony V2. *Id.*, 1033:18-1035:22. He further testified that in fact one "would want to optimize" for this size effect. *Id.* But Dr. Cooper did not explain, much less with the required particularity, why the size difference between the small readout cassette and much longer amplicons would be insubstantial. Indeed, Dr. Cooper admitted that he "do[es] not specifically explain or account for size difference in [his] doctrine of equivalents argument," other than to make the conclusory statement that "it's an insubstantial difference." *Id.*, 1035:17-22. But "mere generalized testimony as to equivalence is insufficient as a matter of law to support a jury verdict finding infringement under the doctrine of equivalents." *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1188 (Fed. Cir. 1998); *Malta v. Schulmerich Carillons, Inc.*, 952 F.2d 1320, 1327 (Fed. Cir. 1991) (affirming JMOL of non-infringement under DOE; rejecting "offhand and conclusory statements" as "not sufficiently

particularized evidence" to support "the technical issue of equivalency").

Dr. Cooper's testimony that readout cassettes and amplicons both "lead to substantially the same result" because they "lead[] to detection of the amplicons…" is equally conclusory. Trial Tr. 1682:22-1683:1. This is part and parcel of Dr. Cooper's theory that a readout cassette is equivalent to an amplicon because it serves as a "surrogate" for the amplicon. *Id.*, 979:21-980:6. But even if a readout cassette could be deemed a "surrogate" for an amplicon, it still must be substantially the same as an amplicon to fall under DOE. As discussed above, there are substantial differences between a readout cassette and an amplicon. Indeed, even Dr. Cooper does not dispute Dr. Oliphant's testimony that in Harmony V2, immobilizing amplicons did not work, but immobilizing readout cassettes did. *Id.*, 1625:3-19.

Third, Dr. Cooper relied on an irrelevant Ariosa patent application to support his DOE opinion. Ex. 727. Dr. Cooper pointed to claim 18 in that application, which recited immobilizing an entire amplification product (*i.e.*, an amplicon) to an array, and remarked that it is "hard to imagine that they would have claimed an invention that they knew didn't work." *Id.*, 1681:12-20. This was another sideshow. The issue for DOE is not whether immobilizing an actual amplicon would never work for any assay; instead, the issue is whether, in *the specific context of Harmony V2*, immobilizing readout cassettes "performs substantially the same function in substantially the same way to obtain the same result" as immobilizing amplicons as claimed. *Graver Tank & Mfg. Co. v. Linde Air Prods., Co.*, 339 U.S. 605, 608 (1950) (quotation omitted). Dr. Cooper in fact admitted that "Version 2 of Harmony doesn't use that Claim 18." Trial Tr. 1700:7-11. The law is clear that infringement by equivalence is to be determined by comparing the claimed elements of the patent *to the accused process*—not, for example, to alternative embodiments an accused infringer may have included in a patent application. *See, e.g., Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997) (under DOE, accused device "may … be found to infringe if there is 'equivalence' between *the elements of the accused product or process* and the claimed elements of the patented invention") (emphasis added); *Dawn Equip. Co. v. Ky Farms Inc.*, 140 F.3d 1009, 1015 (Fed. Cir. 1998) ("[T]o establish infringement under the doctrine of equivalents, the *accused device* must be shown to include an equivalent for each literally absent

claim limitation") (emphasis added).

In sum, no reasonable juror could find that Harmony V2 practices steps 1(a), (b), (f) or (g), and the Court should grant JMOL of non-infringement for Harmony V2. *Cordis*, 658 F.3d at 1357 (affirming grant of JMOL of non-infringement; "[t]he question is not whether there is literally *no evidence* supporting the unsuccessful party, but whether there is evidence upon which a reasonable jury could properly have found its verdict."). At a minimum, a new trial on the issue of infringement of the '794 patent by Harmony V2 is warranted.

II. THE COURT SHOULD GRANT JMOL OF NON-INFRINGEMENT, OR A NEW TRIAL, FOR HARMONY V1

A. Harmony V1 Does Not Perform Steps 1(a) And (b) Of The '794 Patent

As with Harmony V2, Ariosa did not perform the "providing" (1(a)) and "contacting" (1(b)) steps of the '794 patent in Harmony V1. Ariosa did not *first* "provid[e] a sample which may contain at least 100 different single-stranded target sequences attached to a first solid support" (1(a)), and *then* "contact[] said target sequences with a probe set comprising more than 100 different single-stranded probes … such that different double-stranded hybridization complexes are formed." Ex. 513 ('794 Patent) at cl. 1(a) and (b). Steps 1(a) and (b) are separate steps and, according to the Court, must be performed in the recited order. Trial Tr. 1855:6-13. However, as Dr. Cooper admitted, Harmony V1 is performed using one step, where by the probes and solid support are added simultaneously to the sample containing the target sequences. *Id.*, 1017:4-11 ("Q. So that's explaining that, in fact, the beads and the probes are added simultaneously in Version 1; correct? A. That's right."). To be sure, the parties disputed whether, in this mixture of simultaneously added ingredients, the target sequences first bind to the probes or to the beads. But that dispute is irrelevant. All of the claims of the '794 patent are method claims, and Ariosa simply did not follow a two-step method in Harmony V1. For this reason alone, the Court should enter JMOL of non-infringement of the '794 patent for Harmony V1 (or in the alternative a new trial).

B. Harmony V1 Does Not Perform Step 1(f) Of The '430 Patent

The undisputed evidence confirms Harmony V1 does not perform '430 patent, step 1(f):

> (f) for each of the plurality of maternal blood samples, **determining the presence or absence of a fetal aneuploidy** comprising **using a number of enumerated sequence reads corresponding to the first chromosome and a number of enumerated sequence reads corresponding to the reference chromosome of (e)**.

Ex. 514 ('430 patent) at cl. 1. Step (e), in turn, recites:

> "for **each** of the plurality **of maternal blood samples, enumerating sequence reads** corresponding to enriched and indexed fetal and maternal non-random polynucleotide sequences selected from the first chromosome tested for being aneuploid and sequence reads corresponding to enriched and indexed fetal and maternal non-random polynucleotide sequences selected from the reference chromosome.

Plaintiffs' only theory at trial was that the claim's inclusion of the word "comprising" meant it was enough that, at some point in the Harmony V1 process, enumerated sequence reads of a "first chromosome" and a "reference chromosome" were somehow "use[d]." Trial Tr. 1450:17-1451:16 (Prof. Quackenbush cross-examination); *id.*, 1889:17-1891:5 (Plaintiffs' closing) ("So if we look back at it, 'comprising using a number,' you have to use them. It's not the only thing you have to use. You merely have to use them."). That argument far oversteps the settled legal meaning of the term "comprising."

"It is true that a method claim with the word 'comprising' appearing at the beginning generally allows for additional, unclaimed steps in the accused process, ***but each claimed step must nevertheless be performed as written***." *David Netzer Consulting Eng'r LLC v. Shell Oil Co.*, 824 F.3d 989, 998 (Fed. Cir. 2016) (emphasis added). Here, step (f) does not require "merely using" enumerated sequence reads, as Plaintiffs' counsel misleadingly argued. Rather, it requires using those enumerated sequence reads in a very specific way—for "determining the presence or absence of a fetal aneuploidy." In addition, as recited in step (e), the enumerated sequence reads used to determine aneuploidy must be reads from *each* maternal sample. Ex. 514 at cl. 1(e) ("for each of the plurality of maternal blood samples, enumerating sequence reads …"). In other words, the determination of aneuploidy for any given maternal sample must be based on sequence reads from that maternal sample. As discussed below, Harmony V1 does not infringe the '430 patent

because (1) it does not use enumerated sequence reads from a first chromosome and a reference chromosome to determine an aneuploidy risk score, and (2) it does not determine an aneuploidy risk score for a given maternal sample based on sequence reads from that one sample.

Ninety-six maternal samples were sequenced simultaneously in Harmony V1. Trial Tr. 1348:15-21. The undisputed evidence at trial demonstrated that in Harmony V1, the enumerated sequence reads generated from these samples were **not** used to determine aneuploidy. Rather, through a process called "quantile normalization," they were ***discarded and replaced with different values*** based on median sequence counts ***accumulated across all 96 samples***. *Id.*, 1352:4-1356:6. As Ariosa bioinformatics scientist Dr. Wang explained, quantile normalization is a "technique that ignores the actual values of the input," instead "only caring about what the ranks of the individual numbers are." *Id.*, 1351:8-11. Dr. Wang walked the jury through an example of how quantile normalization works in FORTE, and how it takes "all of the cleaned-up sequence counts in the sample, and *replace[s] them* with just the median values" ***across all 96 samples in the sequencing run.*** *Id.*, 1352:4-1356:6 (emphasis added). In so doing, quantile normalization "completely eliminates" the enumerated sequence reads. *Id.*, 1356:4-7. In fact, after quantile normalization, the enumerated sequence reads are no longer even recoverable. *Id.*, 1366:13-17 ("Q. So after this quantile normalization step and the other steps that FORTE undertakes, is it possible to even recover the enumerated sequence reads from the sequencer? A. Probably the jury can also see that it's impossible to recover what were the original input.").

Those quantile normalized values are then further transformed, and the resulting values are ultimately used in a series of Monte Carlo simulations. *Id.*, 1356:15-17; *id.*, 1356:23-1357:8; *id.*, 1361:13-17 (Dr. Wang); *id*, 1413:7-16 (Prof. Quackenbush). Through those simulations, tens-of-thousands of values are randomly selected to generate two probability models, a disomic model and a trisomic model. *Id.*, 1357:9-14; *id.*, 1360:18-1361:17 (Dr. Wang). The trisomic model is further modified based on pre-existing risk estimates, such as maternal and gestational age. *Id.*, 1361:18-1362:15; *id.*, 1412:22-1421:9 (Prof. Quackenbush). FORTE then uses those probability models—not enumerated sequence reads or even quantile normalized values that replaced those reads—to generate a risk score for aneuploidy. *Id.*, 1360:18-1362:15 (Dr. Wang).

Dr. Wang's testimony on FORTE stood undisputed. Dr. Cooper testified he had no disagreement with how Dr. Wang explained (1) "how quantile normalization works in FORTE"; (2) "how FORTE does the Monte Carlo simulations"; and (3) "how FORTE uses those Monte Carlo simulations to calculate a risk score." *Id.*, 1626:5-15. Dr. Wang's testimony demonstrates that Harmony V1 did not use "enumerated sequence reads" to determine the presence or absence of a fetal aneuploidy—those sequence reads are never input into the simulations that produce a risk score, but instead are completely eliminated through the quantile normalization process. Dr. Wang's testimony also demonstrates that FORTE did not use enumerated sequence reads from "each" "maternal blood sample," as Claim 1 of the '430 patent further requires, to determine the presence or absence of aneuploidy for that sample. Instead, the values input into FORTE to determine a risk score for any given sample in a sequencing run represented median values across all 96 samples in that run, not sequence reads from individual samples.

Finally, it was undisputed that Harmony V1 did not determine the presence or absence of a fetal aneuploidy using enumerated sequence reads from a "reference chromosome," as step 1(f) requires. The Court construed "reference chromosome" to mean "a chromosome different from the particular chromosome that is being tested for aneuploidy." Trial Tr. 1855:3-5. But Plaintiffs never adduced evidence of any such "reference chromosome" in Harmony. As alleged evidence of a "reference chromosome," Dr. Cooper pointed only to a "proportion" that FORTE generates as a preliminary step feeding into the determination of a risk score. *Id.*, 929:7-15; Ex. 461A at 3. This proportion uses normalized mean values derived from a test chromosome (13, 18 or 21) in the numerator, and the sum of normalized mean values derived from each of chromosomes 13, 18 and 21 in the denominator. Trial Tr. 929:7-15 (Dr. Cooper); *id.*, 1356:19-1357:5 (Dr. Wang).

The problem with Plaintiffs' infringement theory is that the same chromosome serves as both the test chromosome (in the numerator) and as a reference chromosome (in the denominator)—irrespective of whether 13, 18 or 21 is the test chromosome in the numerator (because all of them are in the denominator). *Id.*, 929:7-15. This is contrary to the Court's claim construction, pursuant to which a "reference chromosome" is "a chromosome different than the particular chromosome that is being tested for aneuploidy. *Id.*, 1855:3-5. The Court's claim

construction is consistent with the testimony of Dr. Rava, a named inventor of the '430 patent, who admitted that he "would never use the same chromosome as the chromosome I was trying to measure a[s] the reference chromosome." *Id.*, 352:2-3. Accordingly, for this additional reason, Harmony V1 does not practice claim element 1(f).

The Court should enter JMOL of non-infringement of the '430 patent, or alternatively grant a new trial because the jury's infringement verdict is against the weight of the evidence.

III. ARIOSA IS ENTITLED TO JMOL ON DAMAGES

Plaintiffs had the burden to prove the amount of their damages. *See Lucent Techs., Inc. v. Gateway, Inc*., 580 F.3d 1301, 1324 (Fed. Cir. 2009) ("The burden of proving damages falls on the patentee."). Plaintiffs failed to satisfy this burden.

A. There Is No Evidentiary Support For Damages On Harmony V2

As explained above, Plaintiffs' infringement case against Harmony V2 for steps 1(a) and (b) of the '794 patent was based on a theory that an infringing reaction may occur that, under Plaintiff's own theory, is unintended by Ariosa and would only affect a miniscule number of molecules in the sample. Plaintiffs introduced no evidence that Ariosa obtained any benefit from any such unintended, *de minimis* infringement. Yet Plaintiffs' damages theory was completely unmoored from their own infringement theory and is not supported by substantial evidence.

1. There Is No Evidence Every Harmony V2 Test Infringes

Dr. Cooper offered no explanation for the second required condition for his infringement theory: why any target sequences that failed to hybridize to a single probe during the two-hour hybridization step would hybridize with all three probes after attaching to a bead. *See supra* at § I.A.2. Most critically for damages purposes, Dr. Cooper provided no testimony that in every sample Ariosa tests in Harmony V2, at least 100 target sequences will fail to hybridize to a single probe during the hybridization step, but then will hybridize to all three probes after attaching to a bead. ***Dr. Cooper thus presented no evidence that each and every Harmony V2 test performed by Ariosa infringes.*** Dr. Cooper's own testimony on the "complexity" of the hybridization reaction in Harmony and his inability to quantify even a margin of error for his speculative theory, *see supra* at § I.A.2(c), underscores why no reasonable juror could infer that that the unintended reaction he

posits necessarily occurs each time Ariosa runs a Harmony V2 test.

Even though Dr. Cooper made no claim, and offered no evidence, that every Harmony V2 test run infringes the '794 patent, Plaintiffs' damages expert, Mr. Malackowski, nonetheless testified that Ariosa owes damages on every Harmony V2 test. Trial Tr. 1179:1-18 (damages opinion applies to all 839,553 of Ariosa's tests, including all Harmony V2 tests); *id.*, 1240:12-15 (Malackowski agreeing that he "started with the total numbers…"). Mr. Malackowski simply assumed that every Harmony V2 test infringes. *Id.* But there is no evidentiary basis for that assumption. The jury thus had no basis on which it could quantify damages. *See Lucent Techs.*, 580 F.3d at 1334-35 (vacating and remanding damages award; "[n]o evidence describes how many Microsoft Outlook users had ever performed the patented method or how many times. Lucent had the burden to prove that the extent to which the infringing method has been used supports" damages award); *Pharmastem Therapeutics v. Viacell, Inc.*, No. 02-148 GMS, 2004 WL 2898061, at *4 (D. Del. Dec. 14, 2004), *aff'd in relevant part*, 491 F.3d 1342 (Fed. Cir. 2007) (granting JMOL on damages because court "cannot determine which or how many of the defendants' units infringe, *or how to quantify damages for infringement*.") (emphasis added). The Court should grant JMOL of no damages for Harmony V2, or at minimum a new trial on this issue.

2. Plaintiffs' Damages Case Was Unmoored From Their Theory of Unintended, *De Minimis* Infringement

Plaintiffs' damages case was also devoid of any evidence of benefits Ariosa allegedly obtained from the infringement Dr. Cooper posited. In fact, throughout trial, Dr. Cooper emphasized the unintentional, *de minimis* nature of any such infringement. As Dr. Cooper acknowledged, each Harmony V2 sample has "millions and millions of target sequence fragments." Trial Tr. 965:10-13. Yet he testified repeatedly that out of these millions of target sequences, as few as just 100 of them would allegedly undergo the steps of the claimed method. *See, e.g.*, *id.*, 965:5-21; *id.*, 1603:25-1604:6; *id.*, 1047:11-1048:13. Indeed, when faced with the speculative and conjectural nature of his infringement theory, Dr. Cooper retreated time and again to this "100 issue" as his safe space. For example, after he was forced to acknowledge that his guess of 1% unhybridized target sequences was "an admittedly imprecise estimate," *id.*, 1603-

1604, he argued "with respect to the question of whether there are at least 100, I am very confident in that opinion." *Id.*, 1007:19-23; *see also id.*, 1009:23-1010:5. Dr. Cooper retreated to this safe space because he acknowledged that the vast majority of target sequences hybridize before attaching to a bead and thus undergo the intended non-infringing reaction. *Id.*, 1012:12-13.

A consequence of Plaintiffs' litigation decision to focus on this "100 issue" is that, even under their own infringement theory, any infringement would be both unintended and *de minimis*. The record is devoid of testimony from Dr. Cooper or any other witness that Ariosa derived any benefit from as few as 100 target sequences that supposedly behave in the errant manner Dr. Cooper theorized. Dr. Cooper never opined that these 100 errant target sequences lead to better detection or have any other impact on the Harmony V2 assay. Nor could he, given that there are millions of other target sequences that admittedly do not undergo the steps of the claimed method. *Id.*, 965:14-15 (Dr. Cooper) (framing the question of infringement as "if a small percentage – if a small fraction of the targets" would proceed according to the claims); *id.*, 1012:12-13 (Dr. Cooper) ("the vast majority [of targets] would [first hybridize].").

A reasonable royalty award "must reflect the value attributable to the infringing features of the product, and no more." *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1226 (Fed. Cir. 2014). When only *de minimis* infringement is proven, courts should "preclude large (or perhaps any) awards for minimal infringements." *Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1352 (Fed. Cir. 2000) (Rader, J., concurring). Here, Plaintiffs made no attempt to tie damages to their *de minimis* infringement theory. Indeed, Mr. Malackowski used the entire market value of Harmony V2 as his royalty base. The Court should grant JMOL for this reason as well.

B. The Court Should Grant JMOL On All Damages, Or Grant A New Trial, Because Plaintiffs Failed To Apportion

It is a bedrock principle of patent damages law that when an accused product or method includes patented and non-patented components, a damages expert must properly apportion in calculating reasonable royalties. The strict apportionment requirement "ensure[s] that a reasonable royalty does not overreach and encompass components not covered by the patent." *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F. 3d 1308, 1326 (Fed. Cir. 2014). The Federal Circuit recently reiterated the

importance of apportionment in overturning a jury's reasonable royalty award because the patentee's expert "failed to apportion damages to the infringing functionality." *Finjan, Inc. v. Blue Coat Sys., Inc.*, 879 F.3d 1299, 1302 (Fed. Cir. 2018).

Mr. Malackowski's damages testimony here tracks the analysis that the Federal Circuit found legally insufficient in *Finjan*. Mr. Malackowski conceded at trial that Ariosa's Harmony test includes significant non-patented features that contribute to its success:

> Q. All right. One thing that we can agree on -- I think – is that Ariosa has indeed made many contributions … to its success, including not only FORTE, but other non-patented features of its products; correct? A. Correct. Q. And qualitatively, you'd agree that Ariosa's contributions, that don't have anything to do with the plaintiffs' patents, are significant; is that fair? A. I do. I do.

Trial Tr. 1258:24-1259:14. Indeed, it is undisputed that the Harmony test involves many features beyond what is accused of infringement, including, for example, blood collection using a proprietary preservative, and measuring cell-free DNA. *See, e.g.*, *id.*, 1277:9-14; *id.*, 1520:16-23. The asserted patents also do not claim the FORTE algorithm, which is the heart of how Ariosa calculates risk scores and one of the most valuable components of both versions of Harmony. The details of FORTE are not alleged to be covered by either patent-in-suit. For example, Dr. Cooper admitted that the '794 patent does not disclose "how you use that information that you detect downstream; for example, it doesn't say you can take that information and then assess whether the DNA indicates there's an aneuploidy." *Id.*, 1039:15-20. As for the '430 patent, Plaintiffs' theory was that Harmony's mere use of sequence reads at some point in the process sufficed for infringement because the claims recited the word "comprising." *See supra* at § II.B; Trial Tr. 1450:17-1451:16 (Prof. Quackenbush cross-examination); *id.*, 1889:17-1891:5 (Plaintiffs' closing). Plaintiffs did not claim that the '430 patent covered how FORTE computes a risk score. In his direct testimony on his '430 infringement opinion, Dr. Cooper did not refer to FORTE's use of Monte Carlo simulations, how FORTE constructs disomic and trisomic probability models, how FORTE uses the fetal fraction to ultimately calculate a risk score—in fact, he did not even mention the name FORTE. *Id.*, 1043:20-1044:23. Further, the named inventors of the '430 patent indisputably did not invent or disclose in the patent a risk score algorithm like FORTE. *Id.*, 355:19-22, 357:5-16 (Dr. Rava). The details of the FORTE algorithm are thus non-patented (by

Plaintiffs) components of Harmony and their value should have been apportioned out of damages.

However, Mr. Malackowski admitted that he did not adjust his proposed royalty to account for non-patented features of Harmony: "Q. But with respect to the contributions made by Ariosa to the success of its Harmony product, you did not ultimately calculate any quantitative adjustment to your royalty calculation; correct? A. Correct." *Id.*, 1259:8-12. This Court previously held that it would revisit Plaintiffs' failure to apportion "if evidence at trial shows the Harmony Test includes unpatented features for which apportionment is required." D.I. 561 at 5. The trial record exposed and confirmed this fundamental defect in Plaintiffs' theories.

Not only did Mr. Malackowski erroneously fail to apportion his royalty base, he compounded that error by nearly doubling that base. He used as his royalty base what he called the "expected reimbursement" of $761 for the Harmony test. Trial Tr. 1193:18-24. But it is undisputed that Ariosa only received approximately half of that amount; the other half went to distributors. *Id.*, 1246:3-8 (Mr. Malackowski agreeing Ariosa's average net sales price was roughly half of $761). Plaintiffs' use of the $761 number was improper. For example, all pre-hypothetical negotiation licenses in the record, including the license between Ariosa and Illumina, are based on a percentage of *actual* net sales received by the licensee. *Id.*, 1242:10-21, 1244:18-1245:4 (Mr. Malackowski). Plaintiffs' presentation of this erroneous $761 figure "skew[ed] the damages horizon for the jury." *See Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1320 (Fed. Cir. 2011). The Court should accordingly grant JMOL, or alternatively a new trial, on damages, given the prejudice that resulted from presenting such erroneous numbers to the jury.

C. Plaintiffs' Erroneous Lost Profits Case Skewed Damages

Finally, evidence at trial proved Plaintiffs were not entitled to lost profits for infringement of the '794 or '430 patents. By waving astronomical lost profits numbers (to which they were not entitled) in front of the jury, Plaintiffs again improperly skewed the damages horizon for the jury.

Mr. Malackowski's lost profits opinions were infected with multiple legal errors. First, Mr. Malackowski improperly included Illumina's alleged lost test fees in his lost profits calculations. Trial Tr. 1169:6-9 (stating his lost profits calculations is "made up of three different components of lost profits on sales, test fees, and reagents, and then a residual on royalties"); *id.*, 1181:2-20

(discussing calculation of lost test fees). These fees should not have been included in the lost profits calculations because Plaintiffs themselves characterized these fees as royalties. *Id.*, 235:24-236:18 (Dr. Bird: test fees presented "royalty opportunity"; "test fee or royalty"; "you could also call it a royalty"); *id.*, 458:23-459:16 (Mr. Naclerio: test fees were "royalty based on sales").

As the Federal Circuit specifically held in *Warsaw Orthopedic, Inc. v. NuVasive, Inc.*, 778 F.3d 1365 (Fed. Cir. 2015), "lost royalty payments" are not recoverable as lost profits because "[t]o be entitled to lost profits, … the lost profits must come from the lost sales of a product or service the patentee *itself* was selling." *Id.* at 1376. As this Court has already recognized, under *Warsaw*, the profits that a third-party allegedly would have realized and would have remitted to the plaintiff but for the defendant's infringement are not collectable as lost profits. *Warsaw*, 778 F.3d at 1376; D.I. 561 at 7-8 ("*Warsaw* appears analogous to the situation here."). That is exactly what Mr. Malackowski included in his opinion with respect to test fees, which are simply amounts that third-party licensees paid to Illumina from their sales of non-invasive prenatal tests. Trial Tr. 235:24-236:18 (Dr. Bird); *id.*, 458:23-459:16 (Mr. Naclerio). Whether called "test fees" or a "royalty," these third-party payments, after *Warsaw*, cannot serve as the basis for lost profits. Mr. Malackoswki's opinion based on alleged lost test fees was thus legally erroneous.

Second, Mr. Malackowski should not have been permitted to include in his lost profits calculations the amount of downstream revenue from so-called "convoyed" reagent sales to the third parties who compete with Ariosa. Trial Tr. 1169:6-9 (including lost "reagents" costs in lost profits analysis). The convoyed sales doctrine permits a patentee to recover lost revenue for "unpatented components sold with a patented item," only if they "together were considered to be components of a single assembly or parts of a complete machine, or they together constituted a functional unit." *Am. Seating Co. v. USSC Grp., Inc.*, 514 F.3d 1262, 1268 (Fed. Cir. 2008). In *Warsaw*, the Federal Circuit held that the patentee could not recover lost sales of "fixations" as convoyed sales because "Warsaw never presented testimony that the fixations it sold . . . had no independent function—that is, that they would not work as well in other surgeries not involving the patented technologies." *Warsaw*, 778 F.3d at 1376. Here, Plaintiffs similarly did not present evidence that Illumina's reagents have no function independent of the patented products. To the

contrary, Illumina's entire argument at trial was that those sequencing reagents do not even "pertain" to Illumina's '794 patent. Trial Tr. 1917:14 (Plaintiffs' closing) ("The '794 wouldn't fall into that category. It doesn't pertain to the Goods. It's not about the sequencer.").

Finally, Mr. Malackowski's lost profits calculations improperly include an amalgamation of revenues from corporate entities not limited to the patentee itself, along with a collection of downstream IP "fees" and "reagent sales" based on sales allegedly lost by third-parties. *Id*., 1203:19-1204:5 (lost profits based on Ariosa "tak[ing] a test from Illumina or its partners"); *id*., 1211:18-23; *id*., 1220:10-12; *id*., 1169:6-9. For example, Mr. Malackowski erroneously included in his lost profits opinion profits allegedly lost by Plaintiffs' foreign subsidiaries. *Id.*, 1214:19-23. Because a substantial portion of the alleged lost sales Plaintiffs relied on in their lost profits theories were foreign, Plaintiffs presented no evidence at trial that these sales would be been lost by the ***domestic*** Illumina or Verinata entities that were parties to this action. *See Mars, Inc. v. Coin Acceptors, Inc*., 527 F.3d 1359, 1366-67 (Fed. Cir. 2008) (sales lost by patentee's subsidiaries are not "lost profits"); *Warsaw*, 778 F.3d at 1376 (rejecting as a matter of law lost profits claim for lost fees from licensees as "lost profits must come from the lost sales of a product or service the patentee itself was selling"). These amounts never should have been presented to the jury.

By improperly including the foregoing categories in his lost profits opinion, Mr. Malackowski presented the jury with a bloated damages demand that "skew[ed] the damages horizon for the jury." *Uniloc USA, Inc*., 632 F.3d at 1320; *Waymo LLC v. Uber Techs., Inc*., No. 17-00939 WHA, 2017 WL 5143890, at *3 (N.D. Cal. 2017) (excluding plaintiff's damages expert for offering opinion that was "a transparent attempt to skew the damages horizon and desensitize the jury to the enormity of what Waymo is seeking"). For this reason, too, the Court should grant JMOL on Plaintiffs' damages claim, or alternatively grant a new trial on damages.

IV. CONCLUSION

The jury verdict on infringement and damages is not supported by substantial evidence and at minimum is against the great weight of the evidence. It was also tainted by Plaintiffs' improper arguments and violations of this Court's orders. The Court should grant Ariosa JMOL of non-infringement and damages, or alternatively grant a new trial on those issues.

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Respectfully submitted,

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